US009187307B2

(12) **United States Patent**
Fox

(10) **Patent No.: US 9,187,307 B2**
(45) **Date of Patent: Nov. 17, 2015**

(54) **FUEL SURGE ARRESTOR**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/248,930**

(22) Filed: **Apr. 9, 2014**

(65) **Prior Publication Data**

US 2015/0291407 A1 Oct. 15, 2015

(51) **Int. Cl.**

B67C 11/02	(2006.01)
B67D 7/04	(2010.01)
B67C 11/00	(2006.01)

(52) **U.S. Cl.**

CPC . ***B67C 11/02*** (2013.01); ***B67D 7/04*** (2013.01); *B67C 2011/30* (2013.01)

(58) **Field of Classification Search**

CPC B67C 11/00; B67C 11/02; B67C 2011/30
USPC 141/286, 331–345, 350; 220/86.2
See application file for complete search history.

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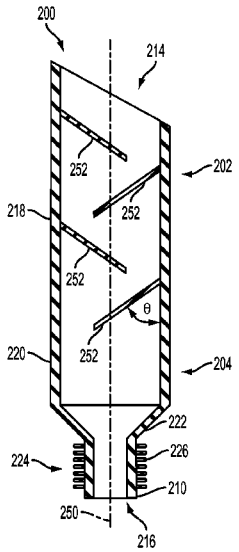
(57) **ABSTRACT**

A fuel surge arrestor can include a funnel shaped to fit within a fuel fill receptacle of a craft. The funnel can have a nozzle opening for accepting a fuel fill nozzle. A vent can be located at a top opening of the funnel. The vent can include a plurality of baffles that enable airflow within the vent while deterring heavy vapors and liquids from exiting the vent during a fuel surge.

14 Claims, 8 Drawing Sheets



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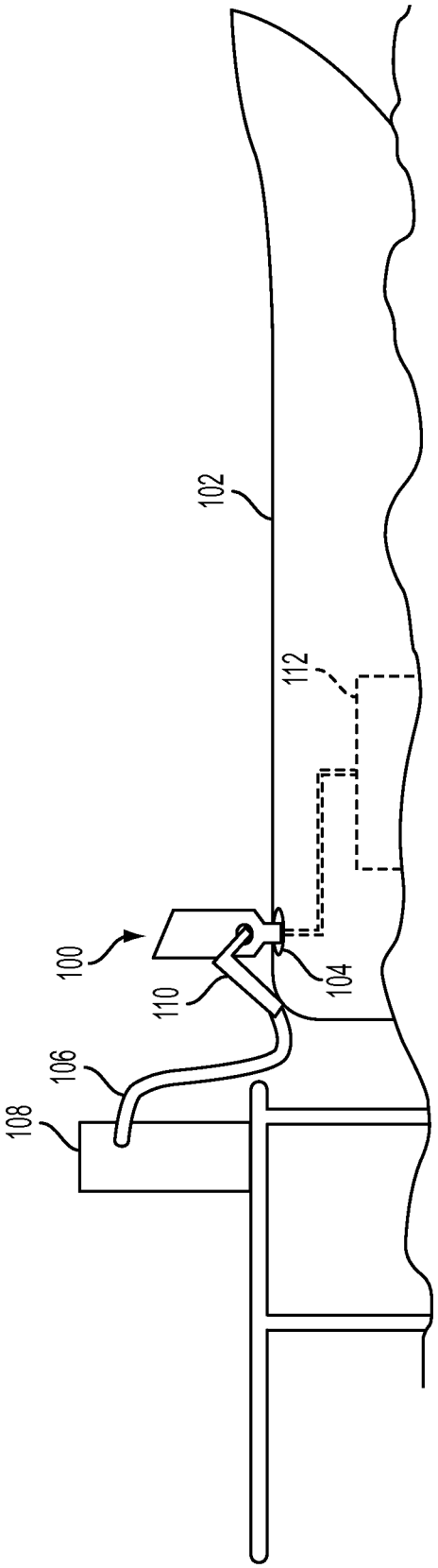
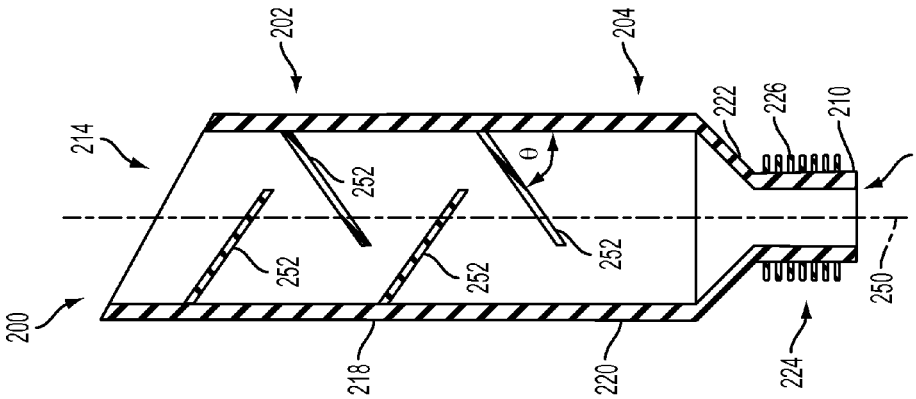


FIG. 1


202
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222
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210
216
θ
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252
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252
200
218
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224
250

FIG. 2B

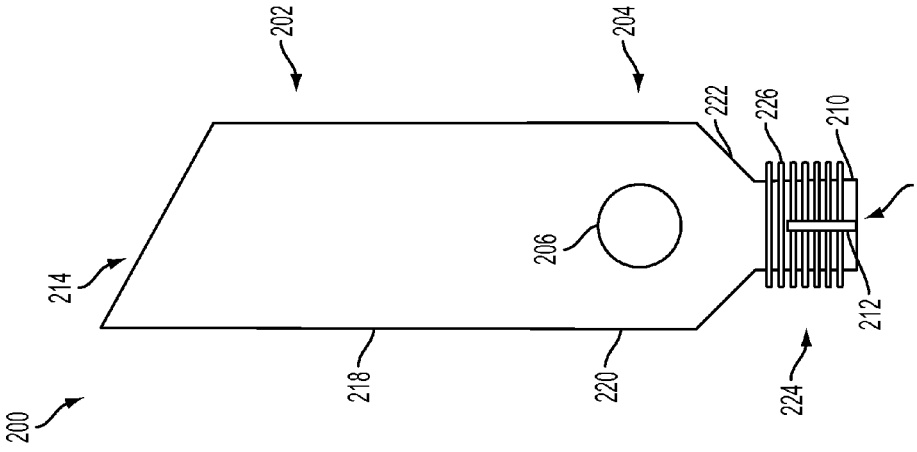
202
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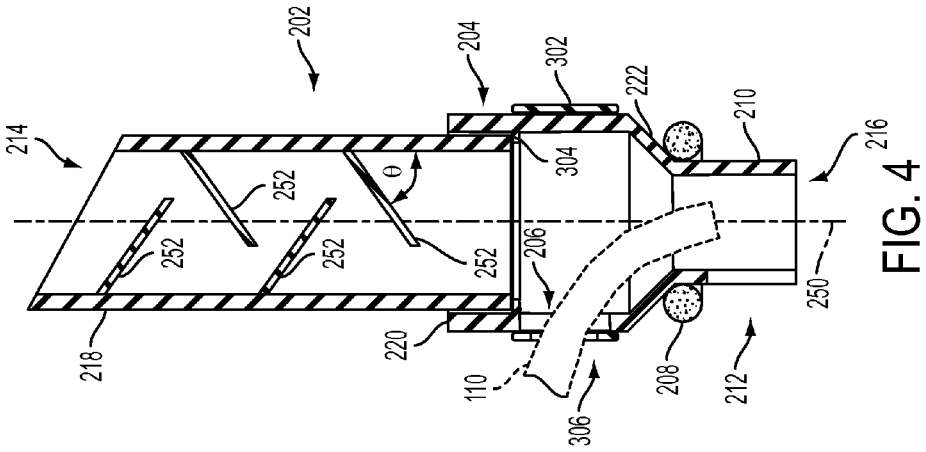
FIG. 2A


202
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302
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214
304
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252
252
252
252
206
250
218
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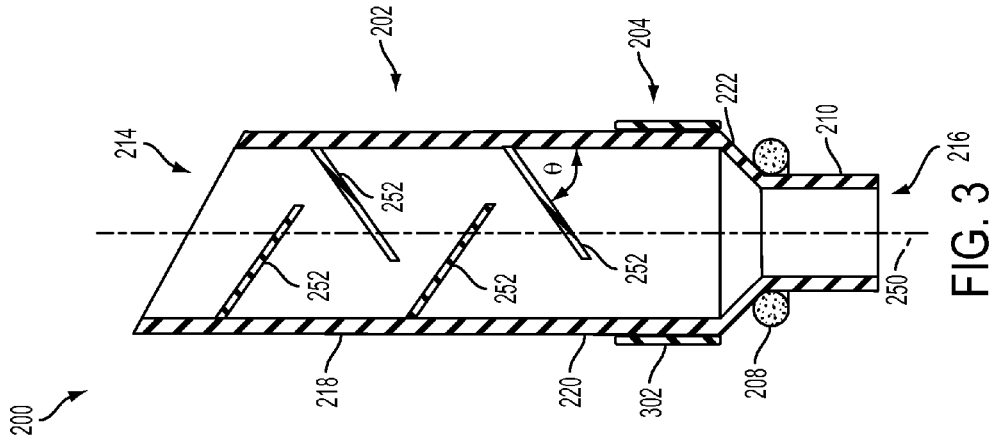
110
306
208
212

FIG. 4


202
204
222
210
216
214
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252
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252
252
250
218
220
302
208
200

FIG. 3

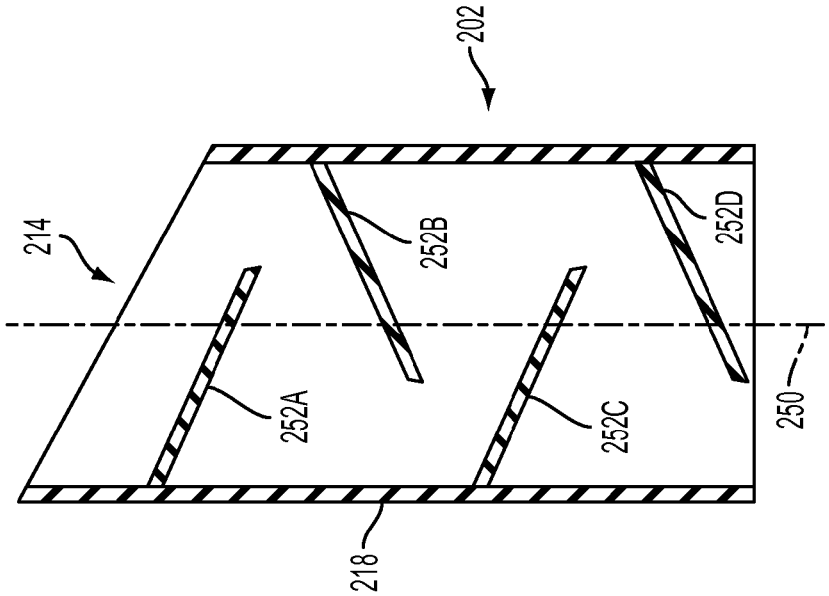


FIG. 5B

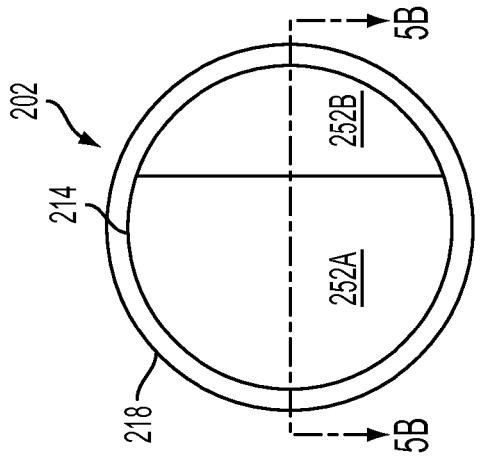


FIG. 5A

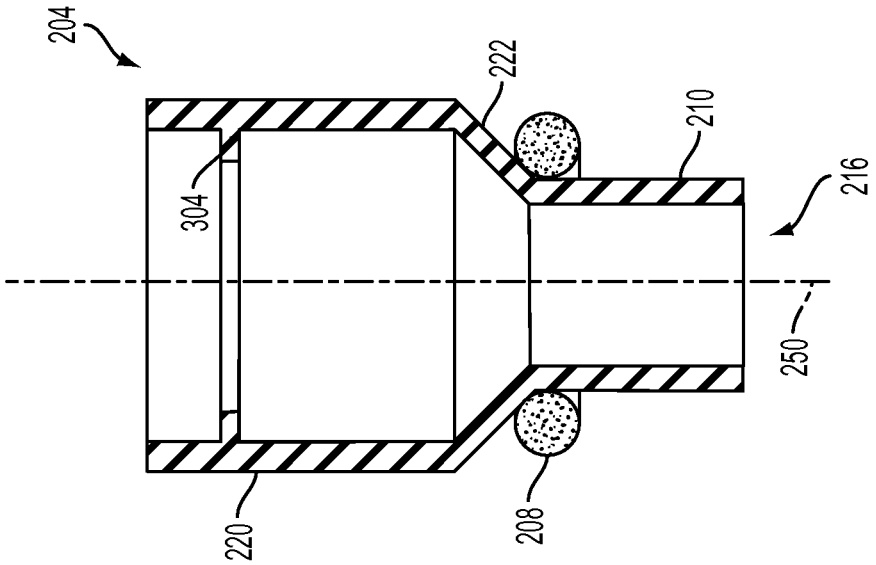


FIG. 6B

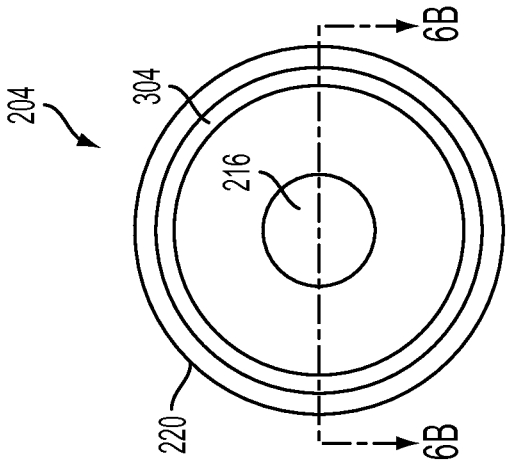
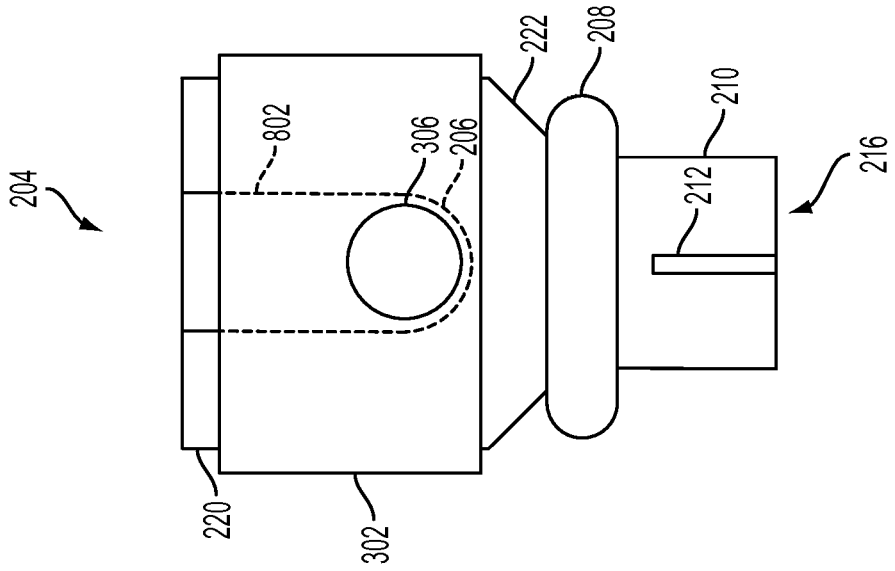


FIG. 6A


204
802
306
206
222
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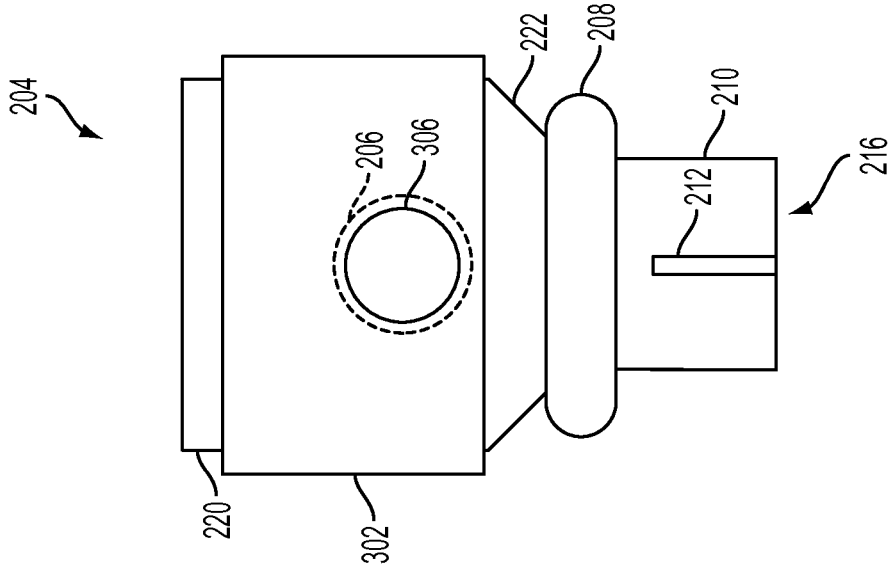
210
212
216
220
302

FIG. 8


204
206
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222
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210
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216
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302

FIG. 7

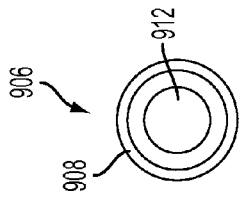

FIG. 9B

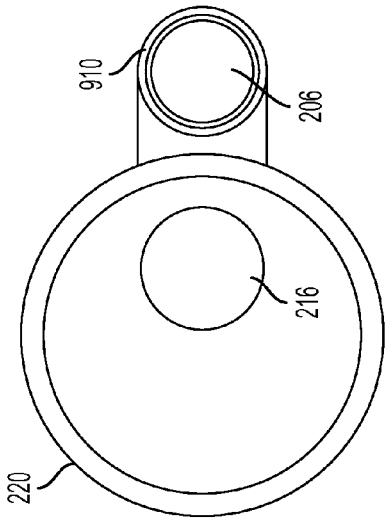

FIG. 9C

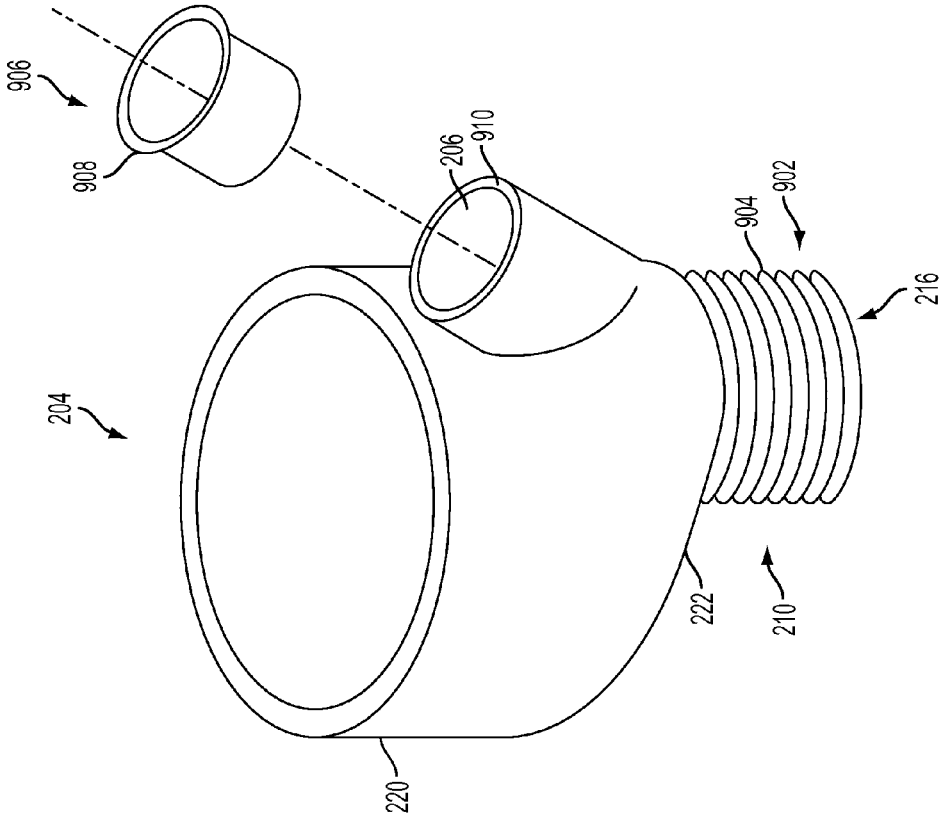

FIG. 9A

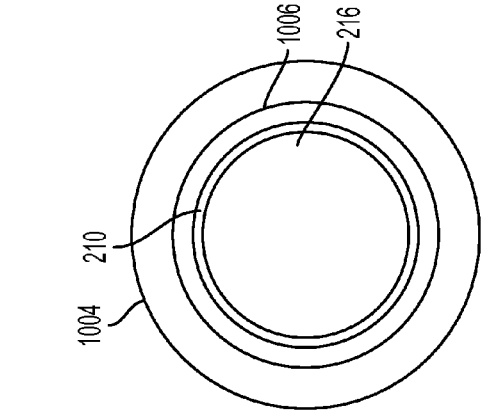

FIG. 10B

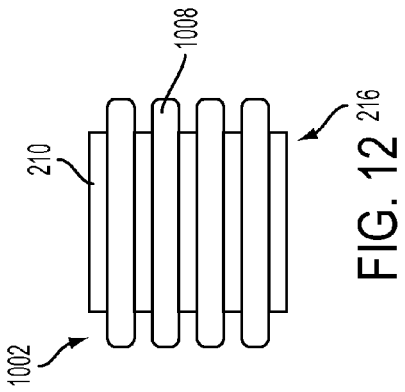

FIG. 12

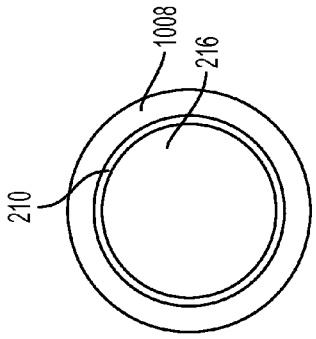

FIG. 11B

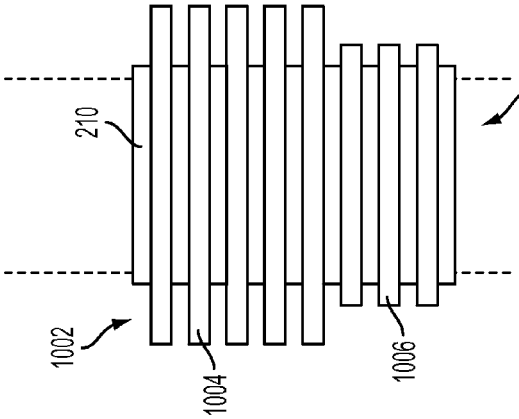

FIG. 10A

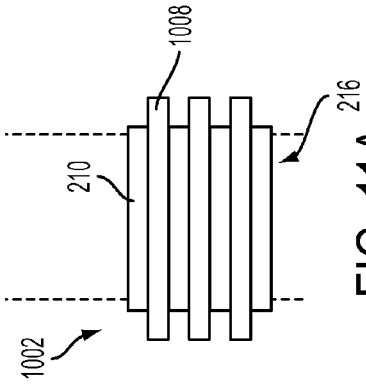

FIG. 11A

FUEL SURGE ARRESTOR

TECHNICAL FIELD

The present disclosure relates to fuel filling devices generally and more specifically to fuel filling devices for boating.

BACKGROUND

In boating and other activities using fuel-powered crafts (e.g., motorcycles, cars, etc), fuel tanks must be refilled on occasion. Often, fuel tanks are refilled from fuel pumps, such as those found on land at standard pumping stations and those found near the water at marine piers. The fuel pumps generally pump fuel out through a nozzle that can be positioned within a fuel fill receptacle of the craft.

A common occurrence when refueling boats and other crafts is a back surge or "fuel surge," sometimes referred to as a "belch." The fuel surge is a surge of fuel and vapors that are expelled out of the fuel fill receptacle during refueling. In boating, the fuel surge can be especially problematic, because it can often result in spillage of fuel onto and over the side of the craft, potentially into surrounding water. Fuel surge results in waste, and more importantly, can cause environmental problems. To combat these environmental problems, many marine fuel filling stations supply boaters with supplies (e.g., paper towels and dispersant sprays) to clean up fuel spills, however these supplies can end up resulting in further waste and additional environmental problems. In addition to the loss of fuel during a fuel surge, loss of vapors can result in waste and environmental problems.

SUMMARY

Statements containing the term embodiment should be understood not to limit the subject matter described herein or to limit the meaning or scope of the claims below. Embodiments of the present disclosure covered herein are defined by the claims below, not this summary. This summary is a high-level overview of various aspects of the disclosure and introduces some of the concepts that are further described in the Detailed Description section below. This summary is not intended to identify key or essential features of the claimed subject matter, nor is it intended to be used in isolation to determine the scope of the claimed subject matter. The subject matter should be understood by reference to appropriate portions of the entire specification of this disclosure, any or all drawings and each claim.

A fuel surge arrestor is disclosed including a funnel and a vent which can be a unitary structure or separable structures. The funnel is shaped to fit within a fuel fill receptacle of a craft. The funnel can include nozzle opening for accepting a fuel fill nozzle. During a fuel surge, expelled fuel is expelled into the funnel and allowed to flow back into the fuel fill receptacle. The vent extends from the top of the funnel and can include a plurality of baffles that enable airflow within the vent while deterring heavy vapors and liquids from exiting the vent. During a fuel surge, expelled vapors can be lifted into the vent and blocked from exiting the vent by the baffles. Heavy vapors can then fall back into the fuel fill receptacle via the funnel.

BRIEF DESCRIPTION OF THE DRAWINGS

The specification makes reference to the following appended figures, in which use of like reference numerals in different figures is intended to illustrate like or analogous components

FIG. **1** is a schematic view of a pier-mounted fuel pump refilling a fuel tank of a boat using a fuel surge arrestor according to one embodiment.

FIG. **2**A is a front view of a one-piece fuel surge arrestor according to one embodiment.

FIG. **2**B is a cross-sectional view of the one-piece fuel surge arrestor of FIG. **2**A according to one embodiment.

FIG. **3** is a cross-sectional view of a one-piece fuel surge arrestor according to one embodiment.

FIG. **4** is a cross-sectional view of a two-piece fuel surge arrestor according to one embodiment.

FIG. **5**A is a top view of a vent according to one embodiment.

FIG. **5**B is a cross sectional view of the vent of FIG. **5**A taken along section **5**B:**5**B according to one embodiment.

FIG. **6**A is a top view of a funnel according to one embodiment.

FIG. **6**B is a cross sectional view of the funnel of FIG. **6**A taken along section **6**B:**6**B according to one embodiment.

FIG. **7** is a front view of a funnel having a nozzle opening according to one embodiment.

FIG. **8** is a front view of a funnel having a nozzle opening and a slit according to one embodiment.

FIG. **9**A is a partially-exploded view of a funnel including an offset stem.

FIG. **9**B is a top view of the insert of FIG. **9**A according to one embodiment.

FIG. **9**C is a top view of the funnel of FIG. **9**A according to one embodiment.

FIG. **10**A is a side view of a stem having a ribbing section according to one embodiment.

FIG. **10**B is a bottom view of the stem of FIG. **10**A according to one embodiment.

FIG. **11**A is a side view of a stem having a ribbing section according to one embodiment.

FIG. **11**B is a bottom view of the stem of FIG. **11**A according to one embodiment.

FIG. **12** is a side view of a stem having a ribbing section according to one embodiment.

DETAILED DESCRIPTION

A fuel surge arrestor is disclosed including a funnel and a vent which can be a unitary structure or separable structures. The funnel is shaped to fit within a fuel fill receptacle of a craft. The funnel can include nozzle opening for accepting a fuel fill nozzle. During a fuel surge, expelled fuel is expelled into the funnel and allowed to flow back into the fuel fill receptacle. The vent extends from the top of the funnel and can include a plurality of baffles that enable airflow within the vent while deterring heavy vapors and liquids from exiting the vent. During a fuel surge, expelled vapors can be lifted into the vent and blocked from exiting the vent by the baffles. Heavy vapors can then fall back into the fuel fill receptacle via the funnel.

The disclosed fuel surge arrestor can advantageously be easily placed on a fuel fill receptacle during a refueling process and easily removed once refueling is complete. Being a portable device, the disclosed fuel surge arrestor can be easily moved between multiple boats, allowing an owner of multiple crafts to use the fuel surge arrestor on multiple crafts, or allowing a refueling station operator to keep a fuel surge arrestor on hand to use with customers. In some embodiments, various parts can be easily disassembled in order to clean the fuel surge arrestor.

These illustrative examples are given to introduce the reader to the general subject matter discussed here and are not

intended to limit the scope of the disclosed concepts. The following sections describe various additional features and examples with reference to the drawings in which like numerals indicate like elements, and directional descriptions are used to describe the illustrative embodiments but, like the illustrative embodiments, should not be used to limit the present disclosure. The elements included in the illustrations herein may be drawn not to scale.

As used herein, the terms "bottom," "top," "down," and "up" are used only to aid in explanation of the accompanying figures and are not to intended to limit the specification or claims in any way.

FIG. **1** is a schematic view of a pier-mounted fuel pump **108** refilling a fuel tank of a boat **102** using a fuel surge arrestor **100** according to one embodiment. The fuel surge arrestor **100** is placed within a fuel fill receptacle **104** of the boat **102**. The fuel fill receptacle **104** is connected to a fuel tank **112**. A fuel surge arrestor **100** can be used with different fuel fill receptacles of different crafts other than boats **102**, such as motorcycles, cars, trucks, ATVs, lawnmowers, tractors, and other fuel-powered crafts. A fuel surge arrestor **100** can be used to refuel any such crafts at any refueling stations or remote locations where fuel is pumped (e.g., automatically or manually) or poured into a fuel tank **112** of the craft.

The fuel pump **108** can include a fuel fill nozzle **110** attached by a hose **106**. The fuel fill nozzle **110** can be designed to be placed within and to dispense fuel directly into a fuel fill receptacle **104** during standard refueling operations. However, as shown in FIG. **1**, the fuel surge arrestor **100** can be positioned to accept the fuel fill nozzle **110** and direct dispensed fuel into the fuel fill receptacle **104**, as described in further detail below.

FIG. **2**A is a front view of a one-piece fuel surge arrestor **200** according to one embodiment. The one-piece fuel surge arrestor **200** is denoted as "one-piece" because the funnel **204** and vent **202** are not separable. The funnel **204** and vent **202** of this one-piece fuel surge arrestor **200** can be made of one part (e.g., formed from a single piece of material) or can be made of multiple parts attached together (e.g., welded, glued, or otherwise permanently joined together).

The vent **202** can include a top opening **214** through which air may enter (e.g., in a direction going down as seen in FIG. **2**A). The funnel **204** can include a nozzle opening **206** shaped to accept a fuel fill nozzle **110**. In some alternate embodiments, the nozzle opening **206** is located in the vent **202** instead of the funnel **204**.

The vent **202** can have a vent wall **218** having a vent wall diameter. The funnel **204** can have a funnel wall **220** having a top diameter at the top end of the funnel **204** and a stem **210** having a stem diameter. The top end of the funnel **204** can be separated from the stem **210** by a reducing section **222**. The top diameter can be larger than the stem diameter. The stem diameter can be sized to fit within a fuel fill receptacle **104**. The stem diameter can be slightly smaller than 1.5 inches to fit a fuel fill receptacle **104** having a 1.5 inch inner diameter. The stem diameter can be slightly smaller than 2 inches to fit a fuel fill receptacle **104** having a 2 inch inner diameter. The stem diameter can be sized to fit within a desired fuel fill receptacle **104**.

In some embodiments, the funnel **204** can include interchangeable stems **210** of different lengths and diameters appropriately sized to fit within the desired fuel fill receptacle **104**. In some embodiments, the funnel **204** can include adaptors to adapt a stem **210** designed to fit within a fuel fill receptacle **104** having a particular inner diameter to fit within a fuel fill receptacle **104** having a different inner diameter.

The stem **210** can include a ribbing section **224** having one or more ribbing elements **226**. The ribbing elements **226** can be a slightly pliable or very pliable materials, such as rubber, plastic, silicone, or other suitable material. As the stem **210** is inserted into a fuel fill receptacle **104**, the ribbing elements **226** can flex to allow insertion. The ribbing elements **226** can engage features of the fuel fill receptacle **104**, such as threads. During removal of the stem **210** from the fuel fill receptacle **104**, the ribbing elements **226** can flex to allow removal. In embodiments where the stem **210** includes a cap slit **212**, as described in further detail below, the ribbing elements **226** can include corresponding slits.

The funnel **204** can include a nozzle opening **206** in the funnel wall **220**. The nozzle opening **206** can be sized to accept a fuel fill nozzle **110**. The nozzle opening **206** can be circular or any other shape capable of accepting a fuel fill nozzle **110**. The nozzle opening **206** can be shaped to facilitate insertion of the fuel fill nozzle **110** so the distal end of the fuel fill nozzle **110** points towards the bottom of the funnel **204**.

Often, fuel fill receptacles **104** are covered by a fuel fill receptacle cap that is attached to, near, or within the fuel fill receptacle **104** by a tether (e.g., a chain). The stem **210** can optionally include a cap slit **212**. The cap slit **212** can be shaped to accept the tether of a fuel fill receptacle cap, allowing the funnel **204** to sit as completely within the fuel fill receptacle **104** in the event the tether of a fuel fill receptacle cap must pass from within the fuel fill receptacle **104** to outside the fuel fill receptacle **104** during fueling.

FIG. **2**B is a cross-sectional view of the one-piece fuel surge arrestor **200** of FIG. **2**A according to one embodiment. The fuel surge arrestor **200** has a center axis **250**. The vent **202** and funnel **204** define a pathway from the top opening **214**, through the vent **202** and the funnel **204**, and out of the bottom opening **216**.

Arranged within the vent **202** of the fuel surge arrestor **200** lies one or more baffles **252**. Baffles **252** can be arranged to allow fluid flow through the pathway, while catching and/or resisting certain fluid flow from the bottom opening **216**, up through the pathway, and out the top opening **214**. In one embodiment, the baffles **252** can be arranged to allow air to flow through the pathway, but catch liquid and/or heavy vapors that may be expelled upwards through the bottom opening **216** during a fuel surge.

Each baffle **252** can be a unitary structure with the vent wall **218**, can be permanently attached to the vent wall **218** (e.g., welded or adhered), or can be removably attached to the vent wall **218** (e.g., the baffle **252** can slide into a slit in the vent wall **218**). In alternate embodiments, the baffles **252** are attached to a frame that is positionable within the vent **202**. As used herein, the term "extending from" and variations thereof are used to describe the general direction of a dimension (e.g., length, width, or other) of a feature and does not limit the feature from being attached to or formed from any other feature.

Each baffle **252** can extend from the vent wall **218** at an angle θ. The angle θ can be less than 90° (i.e., the baffle **252** can extend from the vent wall **218** at an angle generally towards the funnel **204**). In some embodiments, the angle θ can be between approximately 20° and approximately 25°. In some embodiments, the angle θ can be 75° or less. Each baffle **252** can extend from the vent wall **218** at approximately the same angle or at angles different from one another.

Each baffle **252** can extend from the vent wall **218** to partially occlude the pathway. When multiple baffles **252** are used, each baffle **252** can be offset such that two or more baffles **252** overlap one another. Each baffle **252** can extend at

least beyond the center axis **250** of the vent **202**. Each baffle **252** can extend to occlude at least 55% of the pathway through the vent **202**. Each baffle **252** can extend to occlude at least two-thirds of the pathway through the vent **202**.

Each baffle **252** can be planar in shape. In alternate embodiments, each baffle **252** can have different shapes (e.g., wing-shaped, corrugated, or other shapes).

FIG. **3** is a cross-sectional view of a one-piece fuel surge arrestor **200** according to one embodiment. The stem **210** of the fuel surge arrestor **200** of FIG. **3** is shown having a larger diameter than the stem **210** of the fuel surge arrestor **200** of FIG. **2**. In some embodiments, an elastic sleeve **302** can be positioned around the funnel wall **220**. The elastic sleeve **302** can help retain the fuel fill nozzle **110** and for other purposes, as described in further detail below.

A gasket **208** can be placed around the stem **210** and/or reducing section **222**. The gasket **208** can help seal the funnel **204** with the fuel fill receptacle **104**. The gasket **208** can be rubber or any other suitable material. In some embodiments, the gasket **208** can be a ribbed rubber insert. In alternate embodiments, no gasket **208** is used, and instead a ribbed section is used, as described in further detail herein.

FIG. **4** is a cross-sectional view of a two-piece fuel surge arrestor **200** according to one embodiment. The fuel surge arrestor **200** includes a funnel **204** and vent **202** that are separate parts. The vent **202** can sit within the funnel **204** and be placed on a shoulder **304** of the funnel **204**.

The funnel **204** can include a nozzle opening **206**. A fuel fill nozzle **110** is shown in dotted lines. The elastic sleeve **302** is shown having a sleeve opening **306** positioned at the nozzle opening **206**. The sleeve opening **306** is sized to accept a fuel fill nozzle **110**. Due to the elastic nature of the elastic sleeve **302**, the sleeve opening **306** can stretch to best accept the fuel fill nozzle **110** and to reduce the chance that any fluids may escape out of the nozzle opening **206**. The elastic sleeve **302** can be made of rubber, plastic, or any other suitable material. In alternate embodiments, other elastic elements can be included in or around the nozzle opening **206**.

In some embodiments, the funnel **204** does not include a shoulder **304**. In alternate embodiments, the vent **202** can include a feature that ensures the vent wall **218** does not occlude the nozzle opening **206**. In some alternate embodiments, the vent wall **218** also includes an opening which aligns with the nozzle opening **206** to allow a fuel fill nozzle **110** to pass through the vent wall **218** when the fuel fill nozzle **110** is inserted through the nozzle opening **206**.

FIG. **5**A is a top view of a vent **202** according to one embodiment. The vent wall **218** is shown having a top opening **214**. A first baffle **252**A is shown partially occluding the pathway through the vent **202** and partially overlapping a second baffle **252**B. The first baffle **252**A and second baffle **252**B together fully occlude a direct, line-of-sight pathway through the vent **202**. In alternate embodiments, three or more baffles **252** can be used in concert to fully occlude a direct, line-of-sight pathway through the vent **202**. In alternate embodiments, one or more baffles **252** used together can occlude most, but not all, of a direct, line-of-sight pathway through the vent **202**.

FIG. **5**B is a cross sectional view of the vent **202** of FIG. **5**A taken along section **5**B:**5**B according to one embodiment. The first baffle **252**A and second baffle **252**B are visible through the top opening **214**. The third baffle **252**C and fourth baffle **252**D are present below the first baffle **252**A and second baffle **252**B.

FIG. **6**A is a top view of a funnel **204** according to one embodiment. The funnel wall **220** includes a shoulder **304** upon which a vent **202** can be placed. The funnel **204** includes a bottom opening **216**.

FIG. **6**B is a cross sectional view of the funnel **204** of FIG. **6**A taken along section **6**B:**6**B according to one embodiment. The shoulder **304** is shown upon which a vent **202** can be placed.

FIG. **7** is a front view of a funnel **204** having a nozzle opening **206** according to one embodiment. The funnel **204** includes an optional elastic sleeve **302**. The elastic sleeve **302** has a sleeve opening **306** that aligns with the nozzle opening **206** in the funnel **204**. The sleeve opening **306** can be smaller than the nozzle opening **206**. In alternate embodiments, the sleeve opening **306** is the same size or larger than the nozzle opening **206**.

In some embodiments, an insert can be located within the nozzle opening **206** to help with placing a fuel fill nozzle **110** into the funnel **204**. The insert can be rubber, plastic, or other suitable material.

FIG. **8** is a front view of a funnel **204** having a nozzle opening **206** and a slit **802** according to one embodiment. The slit **802** can allow the funnel wall **220** to flex radially outwards. In some embodiments, the vent **202** can be held in place in the funnel **204** by a friction fit between the funnel wall **220** and the vent wall **218**. In some embodiments, the slit **802** allows the funnel wall **220** to flex outwards sufficiently to allow a vent **202** to be placed inside the funnel **204**. Once the vent **202** is placed into the funnel **204**, the elastic sleeve **302** can be placed around the funnel **204** to further secure the vent **202** within the funnel **204** and to provide a smaller opening through which a fuel fill nozzle **110** can be inserted.

In some embodiments, an insert can be located within the nozzle opening **206** and/or the slit **802** to help with placing a fuel fill nozzle **110** into the funnel **204**. The insert can be rubber, plastic, or other suitable material. In some embodiments, the insert can act as a shoulder that keeps the vent wall **218** from occluding the nozzle opening **206**.

FIG. **9**A is a partially-exploded view of a funnel **204** including an offset stem **210** according to one embodiment. The funnel **204** includes a funnel wall **220** having a reducing section **222** and a nozzle opening **206**. The funnel **204** includes a stem **210** with a bottom opening **216**. The funnel **204** can include a stem **210** that is offset from the center of the reducing section **222**. Additionally, the nozzle opening **206** can be positioned to direct a fuel fill nozzle **110** into the stem **210**. The nozzle opening **206** can be angled to position a fuel fill nozzle **110** so that the tip of the nozzle points out the bottom opening **216** of the funnel **204**. The stem **210** can include a ribbing section **902**. The ribbing section **902** can include one or more ribbing elements **904** of uniform or varying shapes or diameters, as described in further detail below.

The nozzle opening **206** can include an insert **906**. The insert **906** can be shaped to rest within the nozzle opening **206**. The insert **906** can include a lip **908** that rests upon a rim **910** of the nozzle opening **206**. The insert **906** can be made of a flexible material, such as rubber, silicone, or any other suitable material. The insert **906** can be permanently adhered to or fused to the nozzle opening **206**, or can be removably placed within the nozzle opening **206**. The insert **906** can include an insert hole **912** through which a fuel fill nozzle **110** can be placed. The insert **906** and the insert hole **912** can flex to tightly fit various sizes and shapes of fuel fill nozzles **110**.

FIG. **9**B is a top view of the insert **906** of FIG. **9**A according to one embodiment. The insert **906** includes a lip **908** that rests on the rim **910** of the nozzle opening **206**. The insert **906** includes an insert hole **912**.

FIG. **9**C is a top view of the funnel **204** of FIG. **9**A according to one embodiment. The funnel **204** includes bottom opening **216**. The funnel **204** includes a funnel wall **220** and a nozzle opening **206** having a rim **910**.

FIG. **10**A is a side view of a stem **210** having a ribbing section **1002** according to one embodiment. The stem **210** can include a ribbing section **1002** that includes one or more first ribbing elements **1004** and one or more second ribbing elements **1006**. The first ribbing elements **1004** are located further from the bottom opening **216** of the stem **210** and have a larger diameter than the second ribbing elements **1006**. The second ribbing elements **1006** are located closer to the bottom opening **216**. The use of the first ribbing elements **1004** of a larger diameter than the second ribbing elements **1006** allow for the stem **210** to form tight seals when inserted into fuel fill receptacles **104** having a range of inner diameters, such as between about 1.75 inches to about 2.25 inches. In smaller fuel fill receptacles **104**, the second ribbing elements **1006** can create a tight seal while the first ribbing elements **1004** may not be inserted into the fuel fill receptacle **104**. In larger fuel fill receptacles **104**, the first ribbing elements **1004** can create a tight seal while the second ribbing elements **1006** create a loose seal or no seal within the fuel fill receptacle **104**.

In some embodiments, the ribbing elements **1004**, **1006** can form a tight seal with the fuel fill receptacle **104** by engaging features of the fuel fill receptacle **104**, such as threads.

In some embodiments, a plurality of ribbing elements of varying shapes and diameters can be used to provide tight seals with a plurality of fuel fill receptacles **104** having varying inner diameters.

In some embodiments, the ribbing elements **1004**, **1006** can be attached to the stem **210**. In alternate embodiments, the ribbing elements **1004**, **1006** can be attached to a sleeve that fits around the stem and can be held in place by adhesion, fusing, friction, or other suitable ways. In some embodiments, a user can select the appropriate sleeve having a ribbing section **1002** designed for certain desired fuel fill receptacle **104** diameters and install that sleeve on the stem **210** of that user's funnel **204**.

FIG. **10**B is a bottom view of the stem **210** of FIG. **10**A according to one embodiment. The stem **210** includes a bottom opening **216**.

FIG. **11**A is a side view of a stem **210** having a ribbing section **1002** according to one embodiment. The stem **210** can include a ribbing section **1002** that includes one or more ribbing elements **1008**. The use of a single set of ribbing elements **1008** allow for the stem **210** to form tight seals when inserted into fuel fill receptacles **104** having inner diameters around a particular diameter, such as diameters around approximately 1.50 inches.

In some embodiments, the ribbing elements **1008** can be attached to the stem **210**. In alternate embodiments, the ribbing elements **1008** can be attached to a sleeve that fits around the stem and can be held in place by adhesion, fusing, friction, or other suitable ways. In some embodiments, a user can select the appropriate sleeve having a ribbing section **1002** designed for certain desired fuel fill receptacle **104** diameters and install that sleeve on the stem **210** of that user's funnel **204**.

FIG. **11**B is a bottom view of the stem of FIG. **11**A according to one embodiment. The stem **210** includes a bottom opening **216**.

FIG. **12** is a side view of a stem **210** having a ribbing section **1002** according to one embodiment. The ribbing section **1002** can have ribbing elements **1008** having a cross-section that is oval in shape. In alternate embodiments, the ribbing section **1002** can have ribbing elements **1004**, **1006**, **1008** having a cross-section that is square, rounded, or any other suitable shape.

The fuel surge arrestor **100**, including the vent **202**, funnel **204**, baffles **252**, and other parts can be made of metal, plastic, or any other suitable material.

The foregoing description of the embodiments, including illustrated embodiments, has been presented only for the purpose of illustration and description and is not intended to be exhaustive or limiting to the precise forms disclosed. Numerous modifications, adaptations, and uses thereof will be apparent to those skilled in the art.

What is claimed is:

1. A fuel surge arrestor, comprising:

a funnel having a stem insertable in a fuel fill receptacle and a funnel wall;

a sleeve removably couplable about the stem and having an external diameter for establishing a seal with the fuel fill receptacle;

a nozzle opening in the funnel wall for accepting a fuel fill nozzle;

a vent including a vent wall defining a pathway fluidly connected to the funnel adjacent the funnel wall;

at least one baffle extending from the vent wall at an angle generally towards the funnel to partially occlude the pathway; and

an additional sleeve removably couplable about the funnel for replacing the sleeve, wherein an external diameter of the additional sleeve is different than the external diameter of the sleeve.

2. The fuel surge arrestor of claim **1**, wherein the at least one baffle includes a plurality of offset overlapping baffles, each of the plurality of offset overlapping baffles extending from respective positions on the vent wall at respective angles generally towards the funnel to partially occlude the pathway.

3. The fuel surge arrestor of claim **2**, wherein: each of the plurality of offset overlapping baffles extends from a wall of the vent at respective angles between approximately 20° and approximately 25°.

4. The fuel surge arrestor of claim **2**, wherein each of the plurality of offset overlapping baffles extends beyond a center axis of the vent.

5. The fuel surge arrestor of claim **4**, wherein each of the plurality of offset overlapping baffles occludes at least two-thirds of the pathway.

6. The fuel surge arrestor of claim **2**, wherein each of the plurality of offset overlapping baffles is planar in shape.

7. The fuel surge arrestor of claim **1**, wherein the stem includes a cap slit for accepting a tether of a fuel fill receptacle cap.

8. The fuel surge arrestor of claim **1**, wherein the funnel wall includes a wall slit extending from a top end of the funnel to the nozzle opening.

9. The fuel surge arrestor of claim **8** additionally including an elastic sleeve surrounding the funnel wall.

10. The fuel surge arrestor of claim **9** wherein the elastic sleeve includes a sleeve opening for accepting the fuel fill nozzle.

11. The fuel surge arrestor of claim **1**, wherein the funnel and the vent are separable.

12. A fuel surge arrestor system for insertion in a fuel fill receptacle of a craft, including:

a first wall defining a fluid pathway between a top opening and a bottom opening;

a nozzle opening in one of the first wall and a second wall, the nozzle opening shaped to accept a fuel fill nozzle;

a plurality of baffles positioned in an offset overlapping arrangement between the nozzle opening and the top opening, each of the plurality of baffles extending from respective positions on the first wall at respective angles between approximately 20° and approximately 75° generally towards the bottom opening to partially occlude the fluid pathway;

a stem couplable to the second wall and insertable in the fuel fill receptacle;

a sleeve removably couplable about the stem and having an external diameter for establishing a seal with the fuel fill receptacle;

an additional sleeve removably couplable about the funnel for replacing the sleeve, wherein an external diameter of the additional sleeve is different than the external diameter of the sleeve.

13. The fuel surge arrestor system of claim **12**, wherein the plurality of baffles extend from respective positions on the first wall at respective angles between approximately 20° and 25°.

14. The fuel surge arrestor system of claim **13**, wherein each of the plurality of baffles extends from respective positions on the first wall to occlude at least 55% of the fluid pathway.

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